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## Claims

We claim:

- 1 1. A method for extracting speech recognition features from a speech signal coded  
2 as a bitstream, comprising:
  - 3 decoding the bitstream to recover linear predictive coding filter parameters;
  - 4 decoding the bitstream to recover a residual signal; and
  - 5 discriminatively combining the linear predictive coding filter parameters and  
6 the residual signal into speech recognition features.
- 1 2. The method of claim 1 further comprising:
  - 2 up-sampling the linear predictive coding parameters; and
  - 3 interpolating the up-sampled linear predictive coding parameters.
- 1 3. The method of claim 2 wherein a set of samples is obtained for every frame of  
2 the bitstream.
- 1 4. The method of claim 2 further comprising:
  - 2 deriving cepstral vectors from the up-sampled LPC filter parameters.
- 1 5. The method of claim 1 further comprising:
  - 2 setting short-term prediction coefficients to zero; and
  - 3 decoding the bitstream to obtain the residual signal.

- 1 6. The method of claim 1 further comprising:  
2 analyzing an entire spectrum of the residual signal.
- 1 7. The method of claim further comprising:  
2 derive a high-dimensional log spectra from the residual signal for each set of  
3 up-sampled LPC filter parameters.
- 1 8. The method of claim 1 further comprising:  
2 deriving a cepstral vector corresponding to each set of linear predicative of  
3 each frame;  
4 deriving a high-dimensional log spectra from the residual signal for each  
5 frame;  
6 concatenating the cepstral vector with each corresponding high-dimensional  
7 log spectra for each frame to generated an extended vector.
- 1 9. The method of claim 8 further comprising:  
2 reducing a dimensionality of the extended vector using linear discriminant  
3 analysis.
- 1 10. The method of claim 8 further comprising:  
2 reducing a dimensionality of the extended vector using discriminant neural  
3 network.
- 1 11. The method of claim 1 wherein the speech recognition features are extracted  
2 from a bitstream in a server executing a speech recognizer.